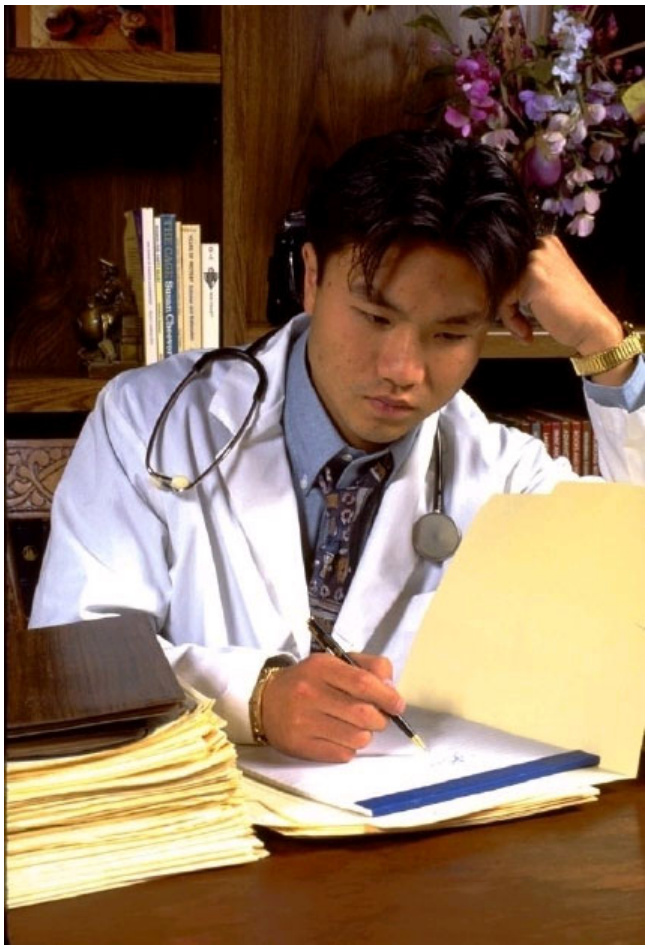
Diabetes Care in Utah

A 2001 Survey of Primary Care Providers



Utah Diabetes Prevention and Control Program
Bureau of Health Promotion
Utah Department of Health
March, 2003

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Introduction

Diabetes is a serious condition, with implications for mortality, morbidity, and activity limitations for those affected. Currently about one in every 25 Utah adults has been diagnosed with diabetes, and the prevalence is reaching epidemic proportions. This trend will inevitably lead to increased medical costs and burden to the health care delivery system. Information on the current status of diabetes prevention and control efforts is essential, if quality of life is to be maintained. In this respect, health care providers play an important role. Therefore, information on provider screening and treatment protocols, knowledge base, information sources, and referral practices and provision of diabetes education warrant attention.

In 2001, the Utah Diabetes Prevention and Control Program conducted a survey of primary care providers in Utah to identify areas where care might be improved and where interventions might be applied that could enhance treatment. The survey questionnaire was adapted from that used by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). Primary care providers included in the survey were general, family and internal medicine physicians, physician assistants, and nurse practitioners. The objective of this survey was to assess physician practice norms; quality of care in Utah; to identify and quantify potential problems or gaps in diabetes treatment awareness, and to guide the development of quality-improvement programs.

The Sample

A merged list of primary care providers was obtained though Utah health plans and Utah Department of Licensing. Only providers who spent at least 50 percent of their professional time in direct patient consultation and care, and who treated patients with diabetes, were included in the analysis. A total of 401 primary care providers participated in the survey. The majority of respondents (63.3%) were in family or general practice. One-fourth (25.7%) were in internal medicine, and a small portion (2.5%) were endocrinologists. Nearly eight percent (7.5%) were in some other type of specialty area. One percent of respondents did not provide their specialty area (Figure 1).

Figure 1.

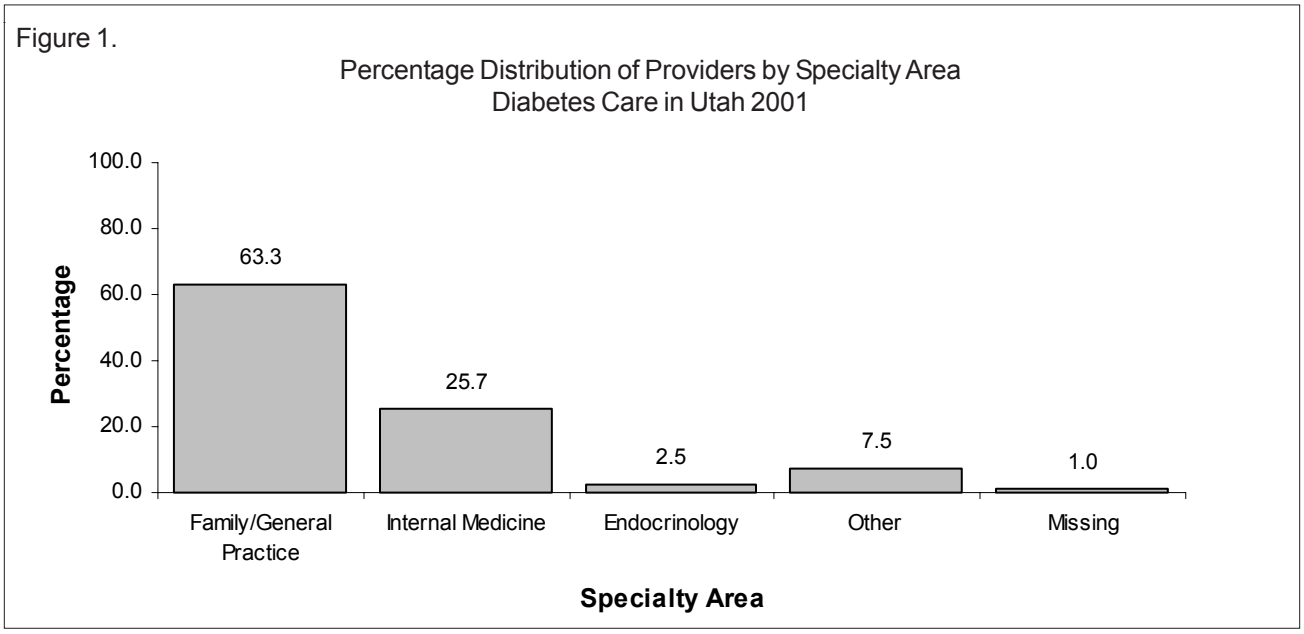
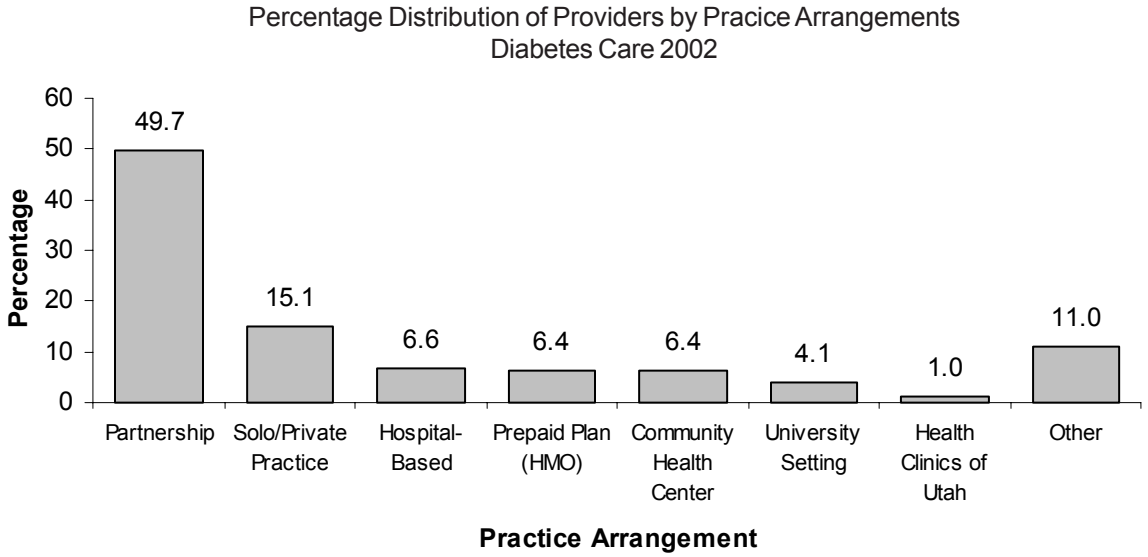


Figure 2.



The modal practice arrangement of respondents was a partnership. About one-half (49.7%) of respondents were in this type of practice arrangement (Figure 2). About one in seven respondents (15.1%) were engaged in solo private practice. Less than ten percent worked in hospital-based practices (6.6%) or community health centers (6.4%). One in 25 (4.1%) worked in a university setting. Eleven percent of the respondents worked in some other practice arrangement, such as corporate entities (1.5%), VA Hospital (1.3%), rural clinics (1.0%), homeless clinic (0.8%), or student health center (0.3%).

The majority of respondents (55.6%) had a medical degree. More than one in five were trained as Advanced Practice RNs (APRN) or Nurse Practitioners (NP) degree, and nearly the same percentage received training as physician's assistants (PA). Another two percent had some other type of degree (Figure 3).

Figure 3.

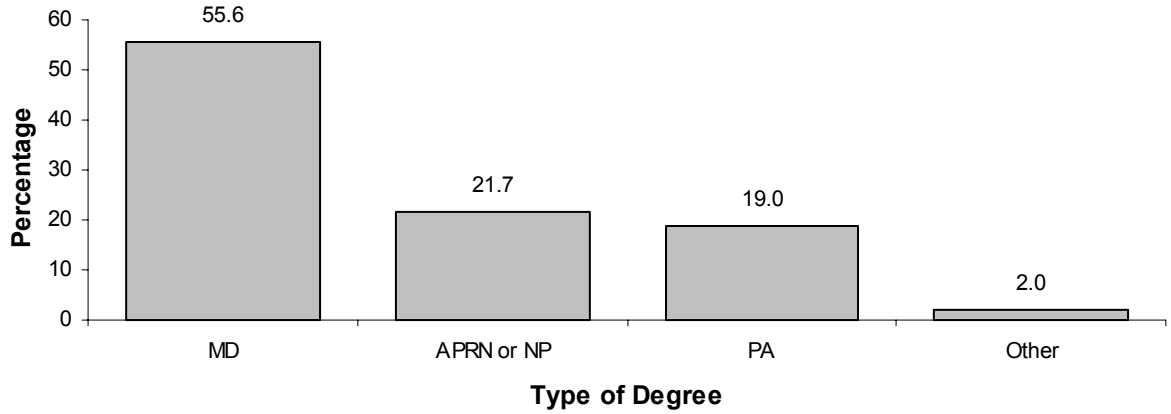
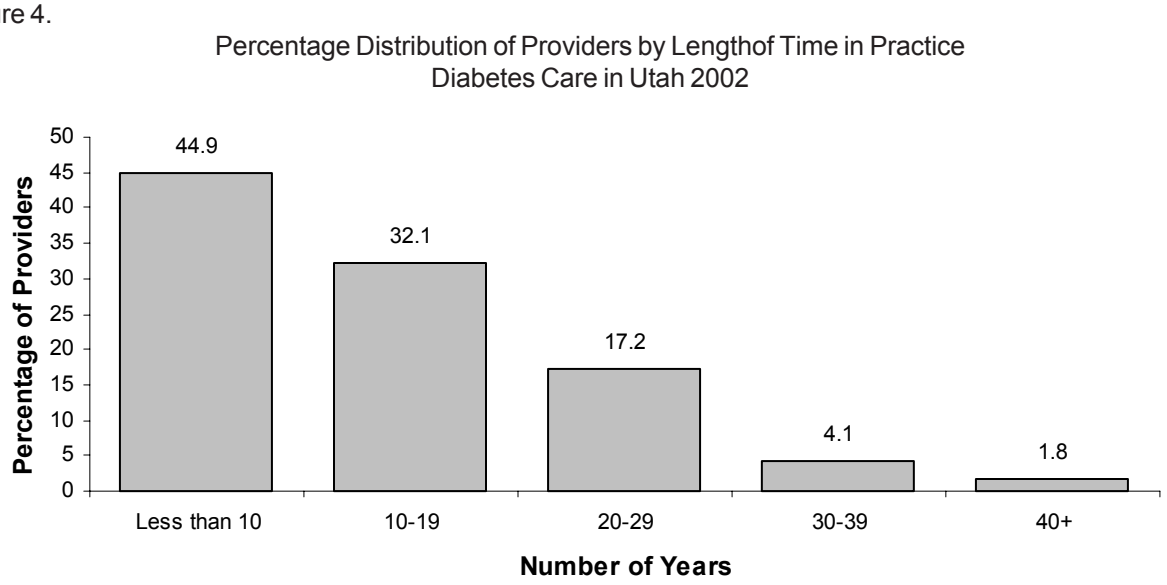


Figure 4.



Close to 45 percent of the respondents (44.9%) had been in practice less than 10 years, and about one-third (32.1%) had been in practice between 10 and 19 years (Figure 4). One in six was in practice between 20 and 29 years, while one out of 25 had been in practice between 30 and 39 years. Just under two percent (1.8%) had been in practice for 40 years or longer.

All areas of the state were presented in proportion to the population with just over three-fourths (78.1%) of respondents were practicing along the Wasatch Front, while slightly more than one in five (21.9%) were practicing in rural areas. About half of the respondents (49.7%) practiced in Salt Lake County (Figure 5).

Figure 5.

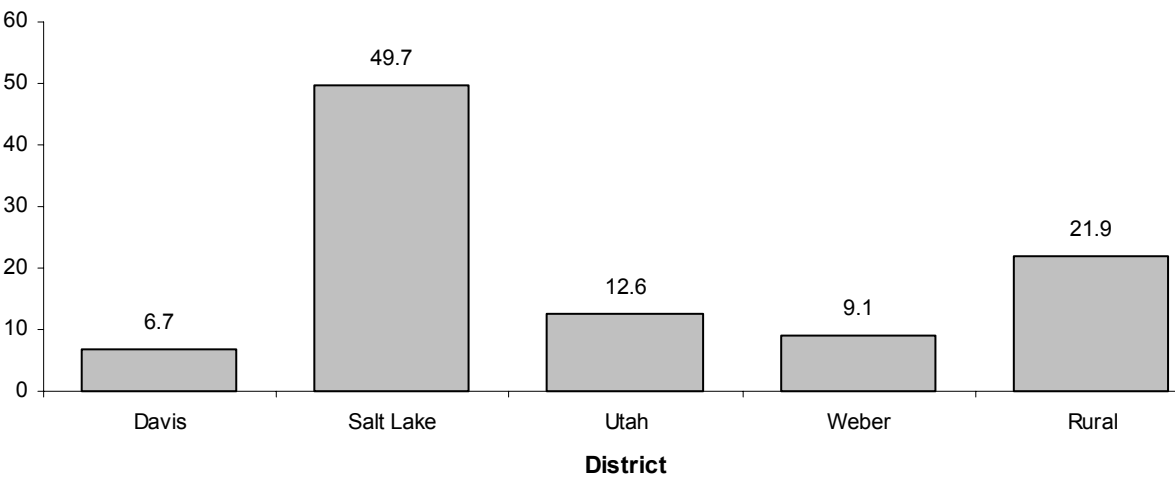
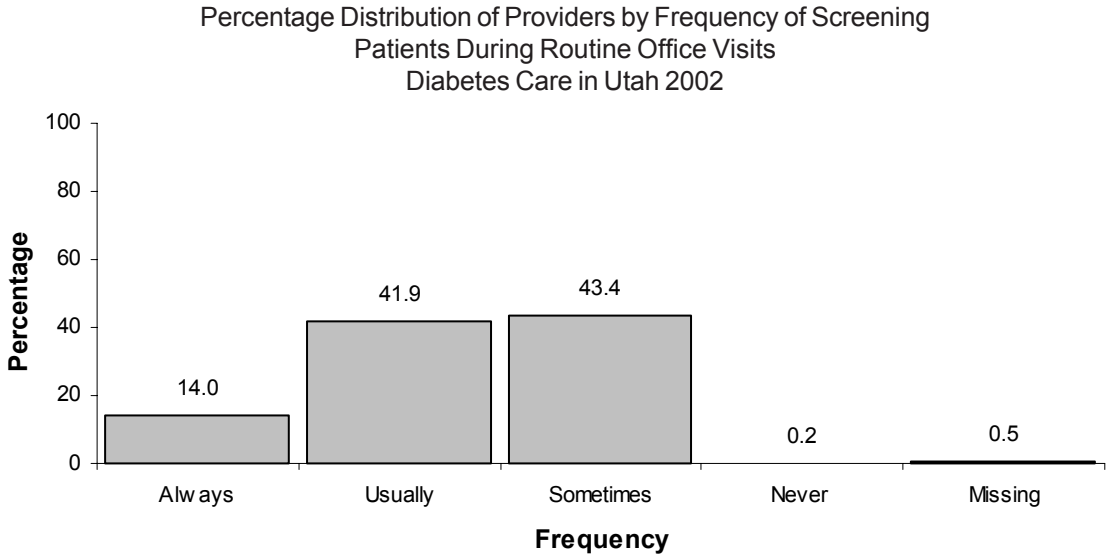


Figure 6.



Screening Patients for Diabetes

Early detection plays a key role in preventing complications. The growing prevalence of diabetes suggests that providers should more aggressively screen patients as an increasing population meets the criteria for testing (see Box 1 for the ADA recommendations for testing for asymptomatic individuals). In this survey, more than four of five providers usually (41.9%) or sometimes (43.4%) screened patients during routine office visits (Figure 6).

Box 1.

Criteria for testing for diabetes in asymptomatic, undiagnosed individuals:

1. Testing for diabetes should be considered in all individuals age 45 and above, and if normal, it should be repeated at three-year intervals.

2. Testing should be considered at a younger age or be carried out more frequently in individuals who:
   - are overweight
   - have first-degree relative with diabetes
   - are members of a high-risk ethnic or racial population
   - have delivered a baby weighting over nine pounds or have been diagnosed with GDM
   - are hypertensive (blood pressure 140/90)
   - have an HDL cholesterol 35 mg/dl (90.90 mmol/l) and/or a triglyceride level 250 mg/dl (2.82 mmol/l)
   - had impaired glucose tolerance (IGT) or impaired fasting glucose (IFG) on previous testing

Source: ADA Clinical Practice Recommendations, 2002. *Diabetes Care* 25 (Suppl. 1): S15 (Table 6)

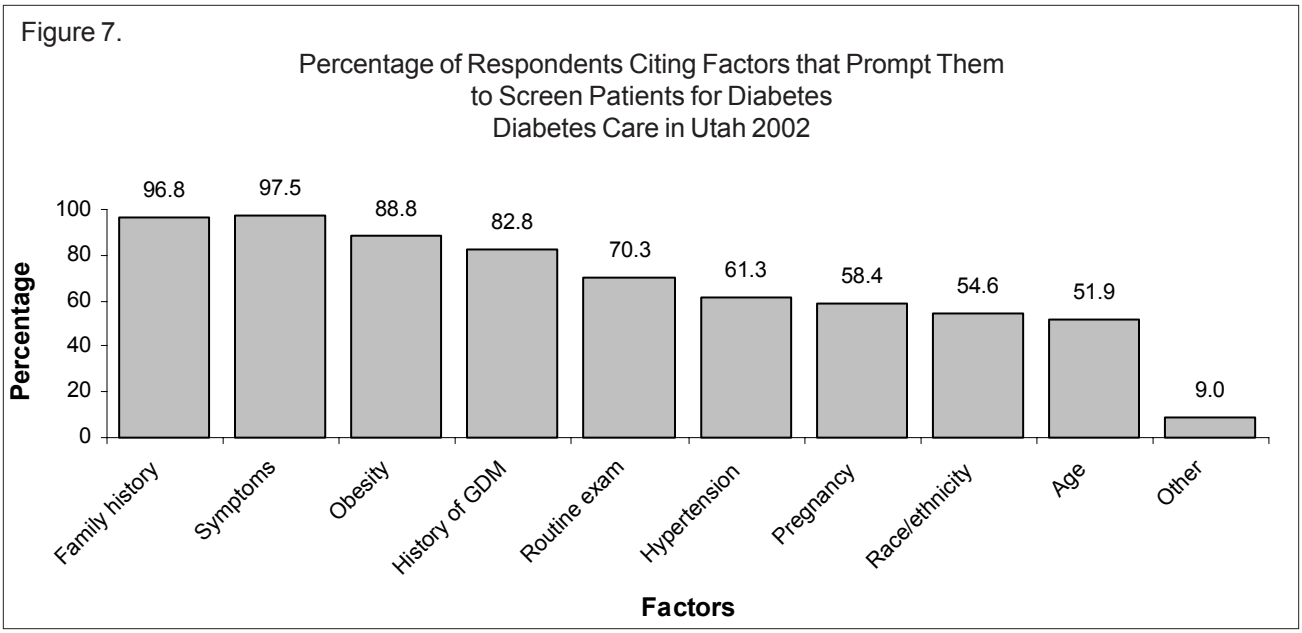
Table 1.
Percentage of Providers Who Always or Usually Screen Their Patients for Diabetes by Selected Provider Characteristics: Diabetes Care in Utah 2001

Provider Characteristics	Percentage Always/Usually Screen	(n)
Professional Degree/Primary Specialty		
Physician-Internal Medicine	65.9 %	85
Physician- FP/GP	44.4 %	144
APRN	67.8 %	87
Physician Assistant	54.7 %	75
Year of Professional Degree		
1995-2000	59.5%	126
1985-1994	53.3%	135
1975-1984	53.2%	94
Pre-1975	60.5%	43
Number of Professional Organization Memberships		
Two or more	44.9%	118
One	56.5	214
None	56.1	66
CME Activity Last 2 Years		
Yes	60.5%	291
No	43.0%	100
TOTAL	**55.9%**	**401**

Note**:** Category cases for each characteristic do not necessarily sum to 401 due exclusion of cases with missing data.

The year of professional degree of providers who always or usually screen their patients for diabetes by specialty area, year professional degree was obtained, number of professional organization memberships, and CME activity are shown in Table 1. APRNs and internists were most likely to always or usually screen their patients (67.8% and 65.9%, respectively), whereas family and general practitioners were least likely (44.4%) to always or usually always screen their patients for diabetes. Those with one or no professional organization memberships were more likely to always or usually screen than those with two or more memberships. Those participating in a CME activity within two years of the survey were much more likely to always or usually screen than those who had not participated in such activity (60.5% vs. 43.0%).

Figure 7.



The specific question for determining factors prompting providers to screen patients for diabetes was: "What factors would prompt you to screen patients for diabetes? (CHECK ALL THAT APPLY)". Nine specific factors were provided as well as an "Other" category (J) wherein providers could specify an additional factor(s). The specific factors included were: A. Family history of diabetes; B. Hypertension; C. Obesity; D. Pregnancy; E. Reporting of symptoms; F. Race/ethnicity; G. History of gestational diabetes; H. Age; and I. Part of routine physical exam.

The prompting factors cited most prominently were a family history of diabetes (96.8 % of all providers), patients' reporting of symptoms (97.5 %), obesity (88.8 %), and a history of gestational diabetes (82.8 %) (Figure 7). In contrast, 61.1% reported that hypertension would be a factor prompting them to screen for diabetes, 58.4 % pregnancy, 54.6 % race/ethnicity, and 51.9 % age. Seven of ten providers indicated that routine exams provided a basis for screening (70.3%). The most commonly listed factors under "Other" were: high cholesterol levels and dyslipidemia, polycystic ovarian syndrome (PCOS,) recurrent infections, fatigue, yeast infections, depression or change in mental status.

Interest also centered on the specific screening test providers most frequently used. The following question was used to ascertain this information: "Of the following tests, which one do you typically use to screen for diabetes? (OTHER THAN FOR PREGNANT WOMEN)". The specific screening tests comprised: A. Fasting glucose; B. Random glucose; C. Oral glucose tolerance test; D. 2-hour postprandial glucose; E. Urine glucose; and F. Hemoglobin A1c. Contrary to instructions, 34.9 percent of providers checked more than one test. It can not be determined how many of the providers who followed instructions and checked only one test actually employed more than one test in their practice.

Table 2.
Percentage of All Utah Providers and Providers Selecting Only One Test Who Use Specific Screening Tests: Diabetes Care in Utah 2001

Screening Test	All Providers (n=401)	Providers Using Single Test Only (n=261)
Fasting glucose	71.3%	62.1%
Random glucose	42.1%	29.1%
Oral glucose tolerance test	4.7%	1.1%
2-hour postprandial glucose	8.2%	2.7%
Urine glucose	12.7%	2.3%
Hemoglobin A1c	16.5%	2.7%

NOTE: Some providers checked more than one test. Therefore, the categories for all providers are not necessarily mutually exclusive; e.g., some providers checking fasting glucose may also have checked one or more of the other tests. The second column of percentages shows the percentage distribution for providers who followed instructions and selected only one test.

Of those who selected more than one screening test, the dominant tendency was to select fasting glucose plus random glucose testing. This combination accounted for one of every four providers who selected more than one screening test (Table 2). More than seven of ten Utah providers reported using fasting glucose testing (71.3 %) while more than two of five reported random glucose testing (42.1 %). Restricting the eligible providers to those who used only a single test, 62.1 percent of these providers used fasting glucose only, followed by the use of random glucose testing only (29.1 % of providers using a single test).

Methods for Treating Type 2 Patients

Respondents were asked to rank (1-4) **)** the treatment most commonly used for type 2 patients (where 1 was most commonly used and 4 was least commonly used). If respondents had only type 1 patients, they were asked to skip the question. The items to be ranked included: treat with diet alone, treat with diet and oral agent(s), treat with diet and insulin, and treat with diet, oral agent(s) and insulin. Ranking code sequences and respective Ns are included in Table 3. Only five respondents provided no ranking whatsoever, some or all of whom could have had no type 2 patients.

Table 3.
Ranking Modalities for Type 2 Patients (Most to Least Commonly Used) Diabetes Care in Utah 2001

Rank	***Treatment Modality***
1	Diet and oral agent(s)
2	Diet alone
3	Oral agent(s) and insulin
4	Diet and insulin

There were variations in the percentages using various treatments, but considering the actual sequencing of all four treatment regimens, there was no clearly dominant profile. Over 27 percent of these providers ranked the diet and oral agent(s) treatment as the most common treatment for their type 2 patients, followed by diet alone, diet, oral agent(s) and insulin, and diet and insulin (Table 3).

Perceived Barriers to Providing Adequate Care to Patients

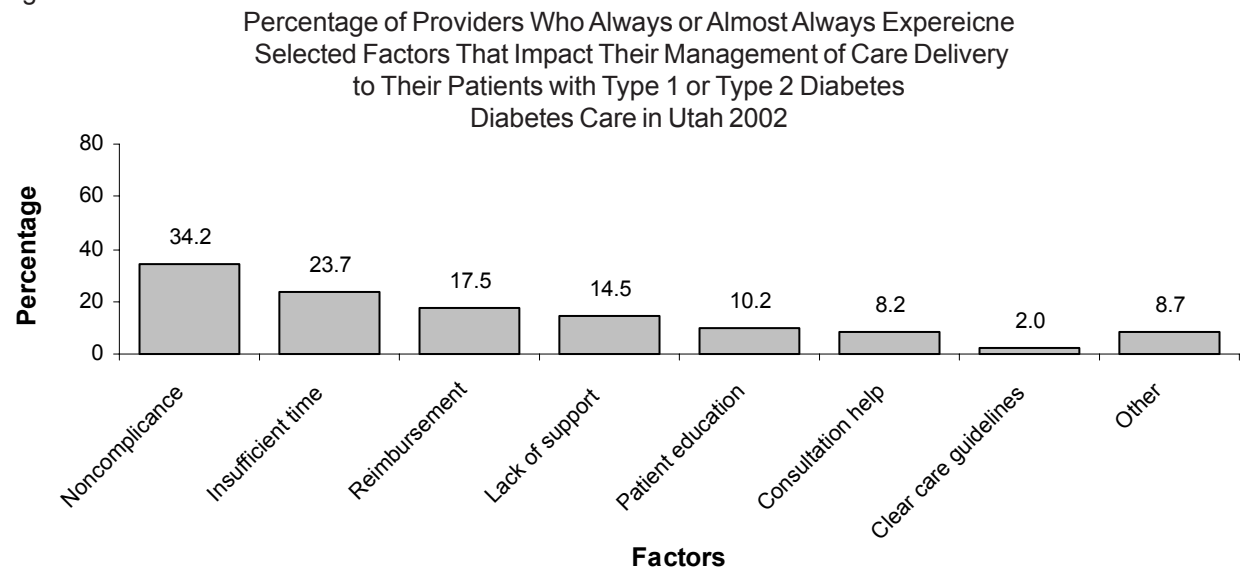
The 2001 Utah Diabetes Provider Survey collected information from providers on the degree to which various items impacted their management of care delivery to their patients with diabetes. The specific question was: " In delivering care to your patients with diabetes (type 1 and type 2), how often does each of the following items impact your management? (CIRCLE ONE RESPONSE FOR EACH ITEM)" Seven specific items were listed as well as one category labeled "Other" where the provider could specify an additional item. The seven specific items were: A. Insufficient time on your part; B. Lack of appropriate support; C. Patient noncompliance; D. Inadequate reimbursement; E. Unavailability of consultative assistance; F. Lack of clear guidelines for care; and G. Lack of useful patient education. The specific response options for each item (including the "Other" item) were Always, Almost Always, Sometimes, and Rarely/Never.

Nearly two of five providers cited none of the seven items as always or almost always impacting the management of their care delivery to their patients with diabetes. Another 29.9 percent cited one item and 13 percent cited two items as having an impact on their care delivery management. Only about one in seven providers indicated that between 3 and 6 items impacted their management of care delivery.

The two items providers were most likely to perceive as always or almost always impacting the management of their care delivery to their diabetes patients were patient noncompliance and insufficient time (See Figure 8 on the following page). Over one of three providers (34.2 %) viewed patient noncompliance and nearly one in four (23.7%) cited insufficient time as always or almost always impacting the management of their care delivery. In contrast, only one in 13 providers viewed consultative assistance unavailability (8.2 %) and one in 50 (2.0 %) perceived lack of clear care guidelines as always or almost always impacting care delivery.

Sometimes the most insightful information comes from the written-in responses. About one of 12 providers cited a factor other than the specific ones listed on the questionnaire. The most commonly cited factors under the "Other" category concerned financial issues, such as uninsured patients, the cost of medications, and insurance problems (e.g., forms were complicated to fill out). Other barriers mentioned were the lack of family support, co-morbid disabling conditions suffered by patients (e.g., arthritis, cognitive disorders, and language barriers).

Figure 8.



Referrals to Health Care Professionals for Patients by Type of Diabetes

Type 1 diabetes is primarily diagnosed in children and young adults. Patients with this type of diabetes must use daily insulin injections. Although this type of diabetes affects only between 5 and 10 percent of the population with diabetes, it generally requires more management, and early age at diagnosis leads to greater opportunity for severe complications. Type 2 diabetes on the other hand, primarily affects other adults, is caused by resistance to insulin and accounts for 90 to 95 percent of all diabetes cases. It may, however, be more difficult to maintain normal levels of blood sugar for type 2 patients. Because prescribed treatments may vary by type of diabetes, this survey was designed to examine the network of health care professionals used by providers engaged in treating type 1 patients, type 2 patients on insulin and type 2 patients not on insulin.

The 2001 Diabetes Provider Survey queried providers on the health care professionals they routinely used in the customary care of three types of diabetes patients, namely, type 1, type 2 (not on insulin) and type 2 (on insulin). The specific question was: " Which of the following health care professionals do you routinely use (either within your practice or through referrals) in the customary care of your patients with diabetes (type 1 and type 2)? (PLEASE CHECK ALL THAT APPLY FOR EACH CATEGORY)." If you have no type 1 or if you have no type 2 patients, please leave those spaces blank." Although providers were asked to cite both those used within the practice setting as well as through referral, no distinction was made between those health care professionals who were located within the provider's own practice setting and those to whom patients may have been referred.

One in eight providers (12.5 %) did not check any of the health care professionals for their type 1 patients, nor did 29 providers (7.2 % of all providers) in the case of type 2 patients on insulin, and 22 providers (5.5 %) in the instance of type 2 patients not on insulin.

More than two of five (41.1 %) providers routinely used five or more health care professionals in the customary care of their type 1 patients, compared to 35.4 percent for their type 2 patients on insulin, and 31.4 percent for their type 2 patients not on insulin.

Less than one-third of all providers (30.9 %) routinely used just between one to three health care professionals in the customary care of their type 1 patients, 43.8 percent in the case of their type 2 patients on insulin, and 48.5 percent for their type 2 patients not on insulin. The mean number of health care professionals used by all providers also varied across patient type. The mean number of health care professionals used by all providers in the customary care of their type 1 patients was 4.26 compared to 4.15 for their type 2 patients on insulin, and 3.85 for their type 2 patients not on insulin. The respective means for just those providers using one or more health care professionals were 4.86, 4.47, and 4.07 health care professionals.

Table 4.
Percentage of All Utah Providers and Providers Who Use One or More Health Care Professionals Who Routinely Use Specific Health Care Professionals (Either Within the Provider's Practice Setting or Through Referral) In The Customary Care of Their Diabetes Patients for Three Different Types of Diabetes Patients
Diabetes Care in Utah 2001

Number of Health Care Professionals	**Patients**		
	Type 1	**Type 2 (On Insulin)**	**Type 2 (Not on Insulin)**
Diabetologist/Endocrinologist	59.6	37.2	16.5
Dentist	22.9	25.7	25.7
Podiatrist	61.8	68.3	65.3
Neurologist	15.7	13.5	11.5
Nephrologist	28.7	2.4.9	20.2
Cardiologist	23.9	25.7	24.4
Psychiatrist/Psychologist	6.2	7	6
Dietitian/Nutritionist	74.8	77.6	79.3
Diabetes Nurse Educator	61.8	65.1	65.8
Social Worker	6.2	7	7.2
Health Educator	13.2	14.7	16.2
Obestetrician	11.2	10.5	10.5
Perinatologist	10.2	6.7	5.2
Pharmacist	20.7	23.7	23.9
Exercise Physiologist/Physical Therapist	5.7	6.5	7.2

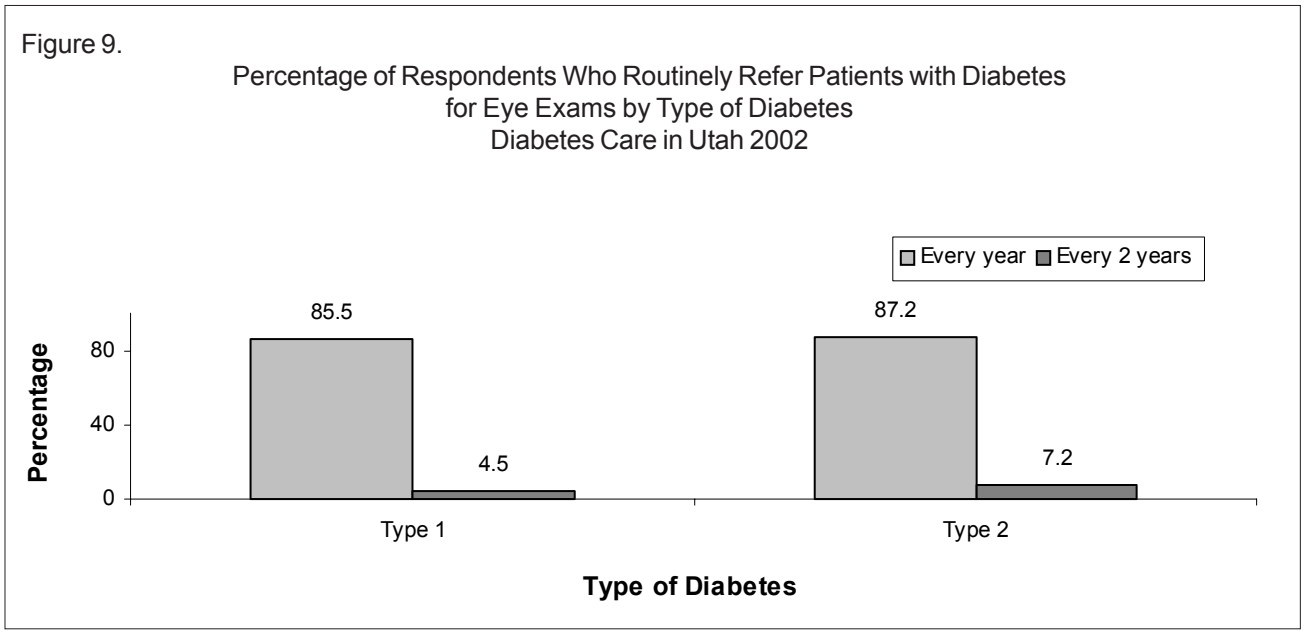
For all three patient types (type 1, type 2 on insulin, and type 2 not on insulin) the three most prominent health care professionals used by providers were dietician/nutritionist (74.6%, 77.6 %, 79.8%) , podiatrist (61.8%, 68.3%, 65.3%) and diabetes nurse educator (61.8%, 65.1%, 65.8%) (See Table 4). There were sharp differences across patient types regarding the use of diabetologists/endocrinologists. Nearly six of ten providers use diabetologists or endocrinologists in the customary care of their type 1 patients (59.6%). In contrast, 37.2 percent of providers use diabetologists/endocrinologists for their type 2 patients on insulin and only 16.5 percent of providers use them for their patients not on insulin. Providers were least likely to use psychologists/psychiatrists, social workers, and exercise physiologists/physical therapists. In each of the three patient types only about one of every 14 to 17 providers routinely used these health care professionals.

Dilated Eye Exams for Patients with Type 1 and Type 2 Diabetes

Dilated eye exams are an important part of diabetes management. Diabetes accounts for eight percent of all blindness in the U.S. and is the leading cause of new blindness among adults between the ages of 20 and 74.[1] People with diabetes are 25 times more likely to become blind than people without diabetes. Diabetic retinopathy, in particular, is one of the most devastating complications of diabetes.

The ADA guidelines define recommendations for eye exams according to age at diagnosis (See Box 2). While there is some variation in the recommendation for the initial time of eye exam by age at diagnosis, annual eye exams are, in general, recommended for both patients with either type 1 (generally diagnosed prior to age 30) or type 2 diabetes. Respondents were asked whether they routinely refer their patients with type 1 and type 2 diabetes for dilated eye exams. Fully 85.5 percent of providers routinely referred their type 1 diabetes patients for annual eye exams, and 87.2 percent referred their type 2 diabetes patients for annual eye exams (Figure 9). Only minimal percentages of providers recommended their patients have eye exams biannually.

Figure 9.



Box 2. Ophthalmologic Examination Schedule		
Patient Group	**Recommended First Examination**	**Minimum Routine Follow-up***
29 years or younger	Within 3-5 years of diagnosis of diabetes once patient is age 10 or older	Yearly
30 years or older	At time of diagnosis of diabetes	Yearly

* Abnormal findings require more frequent follow-up.
Source: ADA Clinical Practice Recommendations, 2002. *Diabetes Care* 25 (Suppl. 1): S92 (Table 1). More detailed information can be found in "Diabetic Retinopathy," Technical Review 1998. *Diabetes Care* 21: 143-159.

Interval for Routine Office Visits for Patients with Type 1 and Type 2 Diabetes

The 2001 Utah Diabetes Provider Survey contained a question on the frequency of routine scheduled office visits for three types of patients with stable or controlled diabetes i.e., type 1, type 2 not on insulin, and type 2 on insulin. The specific question was: "For your patients with stable or controlled diabetes (type 1 and type 2), what is the usual time interval for routinely scheduled follow-up office visits? (CHECK ONE ANSWER FOR EACH COLUMN)." The response options were: A. Monthly; B. Quarterly; C. Semi-annually; D. Yearly; E. Every 2 years; F. Every 3-5 years; and G. Other (please specify). There were no providers who checked E. Every two years, or F. Every 3-5 years in any of the three patient types. Therefore, these two responses are excluded from this evaluation.

The modal response for each patient type was a quarterly office visit, although there was variation in the percentage across patient type(See Table 5). Around seven of ten providers (71.3%)) saw their type 2 patients on insulin quarterly, two-thirds saw their type 1 patients quarterly(67.6%); and, 54.6 percent saw their type 2 patients not on insulin quarterly.

Nearly one third of all providers (31.9 %) saw their type 2 patients not on insulin semi-annually, more than three times the level observed for type 1 patients (10.0 %) and more than twice that observed for type 2 patients on insulin(12.2 %).

A profile of the frequency of scheduled office visits for the five most prevalent combinations of office visits when the three patient types are considered simultaneously was developed. The profile was based on those providers who provided an answer for all three patients types. The most dominant profile was a quarterly visit for each patient type. A clear majority of eligible providers (51.6 %) reported this type of visitation pattern across the three patient types. The second most dominant profile was a scheduled quarterly office visit for type 1 patients and type 2 patients on insulin and a scheduled semi-annual visit for type 2 patients not on insulin. Twenty-two percent of eligible providers reported this combination of visits across patient types. The third major configuration was a scheduled semi-annual visit for all three types reported by nearly eight percent of eligible providers. Achieving the fourth highest ranking was a profile consisting of a quarterly visit for type 1 patients and a semi-annual visit for both type 2 patient types. Only 4.4 percent of eligible providers maintained this type of composite schedule. In sum, these four profiles accounted for about 86 percent of the composite visitation scheduling among eligible providers.

Table 5.

Percentage Distribution of Routinely Scheduled Office Visits for Three Types of Patients with Stable or Controlled Diabetes Diabetes Care in Utah 2001

Frequency of Office Visit	Patient type					
	Type 1		Type 2 (Not on insulin)		Type 2 (On Insulin)	
	All Providers	Providers Excluding Missing and Multiple Responses	All Providers	Providers Excluding Missing and Multiple Responses	All Providers	Providers Excluding Missing and Multiple Responses
Monthly	5.2	6.1	2.2	2.4	3.	3.9
Quarterly	67.7	79.2	54.6	58.1	71.3	79.2
Semi-annually	10.0	11.7	31.9	34.0	12.2	13.6
Yearly	1.0	1.2	4.0	4.2	1.0	1.1
Other	1.5	1.8	1.2	1.3	2.0	2.2
Multilple	0.5	N/A	1.5	N/A	1.0	N/A
Missing	14.2	N/A	4.5	N/A	9.0	N/A
Total	100.0	100.0	100.0	100.0	100.0	100.0
n	*401*	*342*	*401*	*377*	*401*	*361*

NOTE: "Multiple" refers to cases where more than one of the response options in a given patient type was checked.

Frequency of Laboratory Tests Ordered for Type 1 and Type 2 Patients with Stable or Controlled Diabetes

Information was obtained on the frequency of ordering nine specific laboratory tests for the provider's patients whose diabetes was stable or controlled. An additional category was included for the provider to list another test, not specifically included in the listing. Separate information was gathered for type 1 and type 2 patients: The specific question was: " For your stable or controlled type 1 diabetic patients, approximately how often do you customarily order the following laboratory tests ? (CIRCLE ONE RESPONSE FOR EACH TEST)."

The specific tests listed were: A. Random plasma glucose; B. Fasting plasma glucose; C. Glycosylated hemoglobin; D. Quantitative urine protein; E. Random urine dipstick for ketones, protein, glucose; F. Blood tests for BUN; G. Fasting blood tests for LDL cholesterol/triglycerides; H. Creatinine clearance. and I. Microalbumin. As already mentioned, an "Other" category was also included for providers to specify another laboratory test. The response options were: Every 1-3 months; Every 4-6 months; Yearly; 2-3 Years; Only if Indicated; and Rarely/Never. The same question, laboratory tests and response options were used for type 2 patients, with the exception that "type 2" was substituted for "type 1."

There were variations across the various tests in the modal frequency or time interval with the variations similar for both type 1 and type 2 patients (Table 6). A four to six month interval was the most typical frequency for ordering glycosylated hemoglobin and fasting plasma glucose lab tests for type 1 and type 2 diabetes patients. Yearly testing for both patient types was most typical for fasting blood tests for LDL/ cholesterol/triglycerides, fasting blood tests for BUN, random urine dipstick tests, and microalbumin.tests.

Providers were especially likely to order creatinine clearance tests only as indicated for both type 1 and type 2 patients. They were also about as likely to order these tests yearly for both patient types. For both patient types, random blood glucose tests showed the greatest diversity or least time interval concentration in ordering frequency. Roughly similar shares of providers signaled that they ordered these tests every one to three months, every 4-6 months, only as indicated or rarely/never. There was a high degree of consistency in time intervals for ordering laboratory exams for type 1 and type 2 patients. The percentage of providers who gave the same time interval for their type 1 and type 2 patients ranged from around 73 percent in the case of quantitative urine protein tests, and random urine dipstick to more than 84 percent for fasting blood tests for BUN, creatinine clearance and microalbumin, and exceeding 88 percent in the case of fasting blood glucose tests for LDL/cholesterol/triglycerides.

Seven of ten providers reported using a yearly time interval for both type 1 and type 2 patients for fasting blood tests for LDL/cholesterol/triglycerides testing. On the other hand, only one of five providers reported ordering random blood glucose tests every one to three months for both their type 1 and their type 2 patients, once again showing the diversity for this test. Nonetheless, the other two time interval combinations (4-6 months and rarely/never) were also identical for both type 1 and type 2 patients.

Table 6.

Percentage Distribution of Frequency of Ordering Selected Laboratory Test for Stable or Controlled Type 1 and Type 2 Patients Diabetes Care in Utah 2001

Tests	Frequency of Tests							
	Every 1-3 Months	Every 4-6 Months	Yearly	2-3 Years	Only if Indicated	Rarely/ Never	Missing	Total
Random plasma glucose								
Type 1	22.7	17.2	5.0	0.0	19.5	15.7	20.0	100.0
Type 2	19.7	22.7	6.7	0.0	22.9	17.5	10.5	100.0
Fasting plasma glucose								
Type 1	19.0	25.9	9.5	0.2	14.7	10.5	20.2	100.0
Type 2	15.7	32.9	15.0	0.5	15.2	10.0	10.7	100.0
Glycosylated hemoglobin								
Type 1	38.9	42.9	4.2	0.0	0.2	0.5	13.2	100.0
Type 2	31.2	54.1	10.0	0.0	0.2	0.2	4.2	100.0
Quantitative urine protein								
Type 1	3.2	14.0	38.9	2.5	18.9	6.5	16.7	100.0
Type 2	2.0	9.5	41.9	4.0	28.2	7.2	7.2	100.0
Random urine dipstick for ketones, protein, glucose								
Type 1	14.7	24.2	25.2	0.2	13.5	6.5	15.7	100.0
Type 2	13.5	21.4	32.9	1.0	15.0	9.5	6.7	100.0
Blood test for BUN								
Type 1	8.2	29.4	44.9	0.2	1.5	1.2	14.5	100.0
Type 2	6.7	27.7	58.1	0.5	2.5	0.0	4.5	100.0
Fasting blood test for LDL cholesterol/triglycerides								
Type 1	2.2	17.2	63.8	1.5	0.5	0.2	14.5	100.0
Type 2	2.0	17.7	72.6	2.0	0.7	0.0	5.0	100.0
Creatinine clearance								
Type 1	2.0	8.7	31.7	5.7	30.4	5.7	15.7	100.0
Type 2	2.2	6.0	36.4	5.0	37.4	7.2	5.7	100.0
Microalbumin								
Type 1	3.2	16.7	53.9	2.2	4.7	4.0	15.2	100.0
Type 2	3.0	4.2	61.3	3.7	7.2	3.2	7.2	100.0

Diabetes Education

Patients who never had a diabetes education class have a much higher risk of having a major complication than those who have not.[1] The 2001 Utah Provider Survey, therefore, included a series of questions focused on various aspects of diabetes education for patients. The response options for Question 20A were 1. Provide education as part of routine office visit; 2. Formal program within practice setting; 3. Referral to outside diabetes education program; and 4 Other (specify). Providers were instructed to check all that apply. The following question asked providers: If you provide such education in your office, who performs the diabetes education?. Five options were provided and respondents were asked to CHECK ALL THAT APPLY: 1. Practitioner (M.D.); 2. Office Nurse (L.P.N./ R.N.);3. Office Dietician (R.D.); 4. Office Medical Assistant; and 5. Other (Specify). Finally, for each person checked providers were asked to Check Here if this person is a Certified Diabetes Educator (CDE) Lines were provided next to each person for the check marks.

Almost all (92.6%) of providers either provide or refer their patients for diabetes education.Of those providing or referring, 72.2 percent referred, 59.9 percent provided education as part of a routine office visit, and 31. 8 percent had a formal program within their office setting, either singly or in combination. Of the providers indicating that they provided or referred patients for diabetes education, 41.3 percent checked one method; 45.1 percent checked two methods; 13.3 percent checked three methods; and 0.3 percent checked all four methods(including the other category). The mean number of categories checked was 2.0.

The most common arrangements for diabetes education among providers employing at least one of the above methods were routine office visit plus referral and referral only. Nearly one of three (32. 1%) of these providers combined routine visits with referral while one in four used referral alone (26.6 %).

Of those providers having at least one or more persons providing diabetes education in their own office, one quarter perform diabetes education solely (25.2%) while 14.7 percent had a person other than those listed perform diabetes education. Eighteen percent of these providers had an arrangement where either the nurse shares the diabetes education role with the physician (9.0 %) or singly (9.0 %). Six of ten practitioners actually engaged in diabetes education in their offices share this role with one or more other staff members. In 57 percent of these instances an office nurse is included. One-half of nurses engaged in diabetes education in a provider's office are providing that service either solely (25%) or with the practitioner (25%).

Of those providers who checked at least one method, most combined education as part of a routine office visit with referral to an outside diabetes education program(32.1%). The second most employed method was to only refer patients to an outside diabetes education program (26.6%). Nearly 11 percent of providers who checked at least one approach reported that they combined education as part of a routine office visit, had a formal program within their practice setting, and referred patients to an outside diabetes education program. The fourth and fifth most popular methods were to combine education as part of a routine office visit as well as a formal program within the practice setting (10 %) and to have a formal program only (9 percent). In sum, these five approach types accounted for nearly nine of ten providers.

Box 3.
Glycemic Control for Nonpregnant Individuals with Diabetes

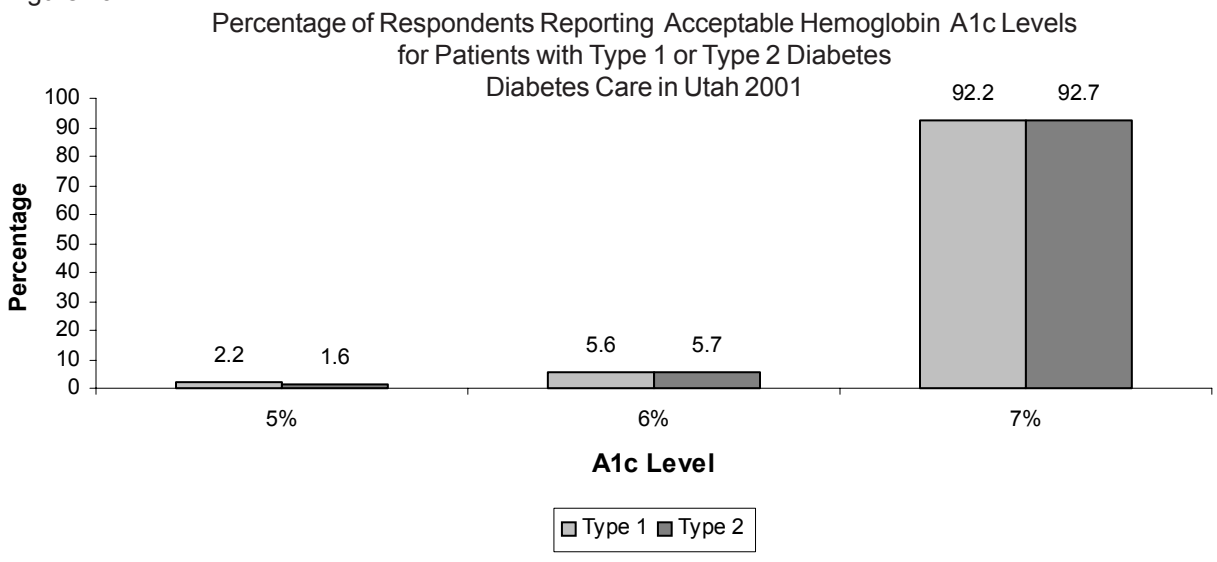
A1c Level	Normal	Goal	Additional Action Suggested
A1c (%)	<6	<7	>8

Source: ADA Clinical Practice Recommendations, 2002. *Diabetes Care* 25 (Suppl. 1): S37 (Table 6)

Acceptable Levels of Hemoglobin A1c

ADA guidelines have a target goal of hemoglobin A1c levels of under 7% (See Box 3). Levels above 8% suggest that additional action to control blood sugar levels is needed, such as a change in medication or an increase in the dosage. Respondents were asked to state what they considered to be an acceptable A1c level for their patients with diabetes. Responses ranged from 5% to 7%. The overwhelming majority of respondents (over 90 percent) stated 7% as the acceptable level for both their type 1 and type 2 patients

Figure 10.



(Figure 10).

Immunization Recommendations for Patients with Diabetes

The 2001 Utah Diabetes Provider Survey contained several questions seeking providers' recommendations for influenza and pneumococcal vaccinations. The first influenza question was designed as a filter question to isolate those providers who routinely recommended an annual influenza vaccination to their patients with diabetes (type 1 and type 2). The specific question was: "Do you routinely recommend an annual influenza vaccination to your patients with diabetes? (Type 1 and type 2)." The response options were: A. Yes and B. No. Those providers who checked "No" were instructed to skip the next question. Those respondents who checked "Yes" proceeded to next question aimed at primarily determining whether these providers recommended an annual influenza vaccination to all their diabetes patients or just to selected age subgroups (45 and over, 55 and over, and 65 and over). The specific question was: "For which patients with diabetes (type 1 and type 2) do you routinely recommend an annual influenza vaccination? (PLEASE CHECK ONLY ONE). The specific response options were: A. All patients with diabetes; B. Patients age 45 and over; C. Patients age 55 and over; D. Patients age 65 and over; E. Do not routinely recommend; and F. Other.

The pneumococcal question did not have the same formatting as the influenza question. First, there was no filter question and no reference time point was used. Second, the response options were similar to those employed in the influenza question , but with a smaller set of options. The specific question was: "For which patients with diabetes (type 1 and type 2) do you routinely recommend a pneumococcal vaccination? (PLEASE CHECK ALL THAT APPLY)". The specific response options were: A. All patients with diabetes; B. Patients age 65 and over; C. Do not recommend; and D. Other.

Ninety-six percent of providers reported that they routinely recommended an annual influenza vaccination to their diabetes patients (Table 7). More than 97 percent of providers (97.2 %) reported that they routinely recommended a pneumococcal vaccination to their diabetes patients. Ninety-three percent of providers recommended ***both*** an annua influenza vaccination and a pneumococcal vaccination to their patients with diabetes.

More than 86 percent of providers (86.5%) and 89.9 percent of providers who reported recommending an annual influenza vaccination gave this recommendation to ***all*** their patients with diabetes (Table 8). In contrast, 64.8 percent of providers and 66.7 percent of providers reported recommending a Pneumococcal vaccination to all of their patents with diabetes.

Nearly 63 percent of providers (62.6%) or 67.3 percent of providers who recommended both vaccinations, did make both recommendations to ***all*** of their patients with diabetes.. Providers were about 10 times more likely to restrict pneumococcal vaccinations to those 65 and over than influenza vaccinations (29.9 % vs. 3.0 % in the case of all providers and 30.8% vs. 3.2 % among those providers who did make recommendations).

Table 7.

Percentage Distribution for Provider Recommendation of Annual Influenza Vaccination and Pneumococcal Vaccination
2001 Diabetes Provider Survey

Types of Vaccination and Recommendation	Percentage Distribution	(n)
Influenza	100.0	(401)
Recommends	96.0	(385)
Does not recommend	3.0	(12)
Missing	1.0	(4)
Pneumococcal	100.0	(401)
Recommends	97.2	(390)
Does not recommend	1.5	(6)
Missing	1.2	(5)
Both	100.0	(401)
Recommends	93.0	(373)
Does not recommend	1.5	(6)
Missing	5.5	(22)

NOTE: Influenza vaccination question refers to annual vaccination whereas no time referent is given for the pneumococcal vaccination. Missing data on "Both" protocol refers to a situation where data is missing on one or both vaccinations. For pneumococcal vaccination question, the assumption is made that if "other" is checked, there is and inherent implication.

Table 8.

Percentage of All Providers, and Providers Who Gave a Recommendation, by Vaccination Protocol
Diabetes Care Utah 2001

Type of Vaccination		All Providers		Providers Who Gave a Recommendation	
		%	(n)	%	(n)
Influenza		86.3%	(401)	91.3%	(379)
	All Patients	3.0%	(401)	3.2%	(379)
	Patient 65 and over only				
Pneumococcal					
	All Patients	64.8%	(401)	66.7%	(390)
	Patient 65 and over only	22.9%	(401)	30.8%	(390)
Both					
	All Patients	62.6%	(401)	67.3%	(373)
	Patient 65 and over only	2.7%	(401)	290.0%	(373)

NOTE: Influenza vaccination question refers to annual vaccination whereas no time referent is given for the pneumococcal vaccination. Denominator for providers who gave a recommendation on "Both" protocol excludes cases where data on one or both vaccination types is missing as well as where providers did not actually recommend one or both of the vaccinations. For pneumococcal vaccination question assumption is made that "other" on q26 implies that the provider gave a recommendation.

Knowledge of Selected Diabetes Information Sources

The 2001 Diabetes Provider Survey inquired as to whether providers had knowledge(heard or read about) of five selected diabetes information sources. The specific question was: " Have you heard or read about any of the following? CHECK ALL THAT APPLY). The diabetes information sources were: A. Results from the Diabetes Control and Complications Trial (DCCT); B. American Diabetes Association (ADA) Clinical Practice Recommendations; C. American Diabetes Association (ADA) Nutrition Recommendations and Principles for People with Diabetes Mellitus; D. Utah Diabetes Practice Recommendations; and E. UKPDS (Utah Kingdom Prospective Diabetes Study). As indicated, multiple selections were permitted, i.e., respondents could check more than one information source.

It is important to bear in mind that respondents were asked if they "heard or read" about any of the items. Thus, one can not unravel whether providers had, for example, just heard, how much they heard, about how many items, just read, or even if they did read, the depth of assimilation or understanding of the materials. The possibility that depth of exposure might vary across items is even more problematic. In sum, these data do not permit an assessment of the degree of familiarity or knowledge of any of the items, much less the degree to which the above levels of awareness might vary across the selected items.

One of ten providers had neither heard nor read about ***any*** of the information items. Conversely, about one in eight providers had either heard or read about ***all*** five items. The modal number of items heard or read by providers was three items (24.7 %) followed by two items (22.9 %). The mean number of information items heard or read about was 2.62 (See Table 9).

There was substantial variation in the percentage of providers having heard or read about specific items (See Table 9). Nearly eight of ten providers had heard or read about ADA Clinical Practice Recommendations (77.8 %) and approximately seven of ten had heard or read about the results of the Diabetes Control and Complications Trial (DCCT). In sharp contrast, both Utah Diabetes Practice Recommendations and ADA Nutrition Recommendations and Principles each had been heard or read about by only about one in three Utah providers(36.9 % and 33.9 %, respectively). A clear minority of providers (43.4 %) had heard or read about the United Kingdom Prospective Diabetes Study (UKPDS).

Those providers who had heard or read about four items were most likely not to have or read about ADA Nutrition Recommendations and Principles (46.2 %) of providers who had reported hearing or reading about 4 items). Those providers having heard or read about three items were most likely to have not heard or read about ADA Nutrition Recommendations and Principles and UKPDS (45.5 %). Those reporting having heard or read about just two of the items were most likely not to have heard or read about the previous two items plus Utah Diabetes Practice Recommendations (46.7 %).

If providers had only heard or read about one item, that item most likely was ADA Clinical Practice Guidelines. One-half of providers who had heard or read about only a single item had heard or read about ADA Clinical Practice Guidelines.

Table 9.
Percentage of Providers Who Heard or Read About
Each of Five Diabetes Information (n=401)
Diabetes Care in Utah 2001

Information Items	Percentage	(n)
Diabetes Control and Complications Trial (DCCT) Results	69.8%	(280)
ADA Clinical Practice Recommendations	77.8%	(312)
ADA Nutrition Recommendations and Principles for People with Diabetes Mellitus	33.9%	(136)
Utah Diabetes Practice Recommendations	36.9%	(148)
UKPDS (United Kingdom Prospective Diabetes Study)	43.4%	(174)

NOTE: Cell (n) refer to number of cases in the numerator for each item, i.e., who answered that they had heard or read about the specific information item.

Professional Education

Three-fourths of respondents (74.6%) reported they had attended a formal program or continuing education course on diabetes within the past two years. Among those who had, the most frequently reported sponsor was a meeting sponsored by a pharmaceutical company with 46.9 percent of respondents stating this source, followed by IHC Diabetes and University of Utah update, each accounting for about one-quarter of attendees (26.9% and 26.2, respectively) (Table 10).

Table 10.
Sponsors of Formal Education or Continuing Education Programs States by Respondents Who
Had Attended Diabetes Courses Within the Past Two Years
Diabetes Care in Utah 2001

Sponsor	**Percentage Who Had Attended***
University of Utah Update	26.2
Utah Diabetes Practice Recommendations Session	7.8
National Diabetes Collaborative	3.1
Annual Diabetes Educators Update	3.7
Family Practice Refresher Course-Diabetes Session	19.7
IHC Diabetes	26.9
HealthInsight QI Program	3.1
Meeting Sponsored by a Drug Company	46.9
Other	27.9

*Multiple responses were possible

Over one-fourth of respondents reported attending a meeting or course other than those listed in the questionnaire. "Other" responses were AAFP Annual Convention AANP , ACP, ADA. American Academy of Physician, ANA, AMCP Conference, Other CME Courses, Grand Rounds, Hospital-sponsored class, Joslin Diabetes Center, NAPNAP Conference, National Academy of Nurse Practitioners, National Clinic Symposium for NPS, Utah Association of Osteopathic Physicians and Surgeons, Utah Osteopathic Medical Association, Utah PA Association, and VAPA.

The 2001 Diabetes Provider Survey contained a question aimed at securing information on provider opinion regarding factors that would enhance their routine use of diabetes practice standards. The specific question was: "What would enhance your routine of diabetes practice standards? (CHECK ALL THAT APPLY)" Providers were given 12 response options including: A. Professional education; B. More comprehensive reimbursement; C. Changes in health care policy; D. Endorsement by the Utah Nurses Association; E. Endorsement by the Utah Academy of Physician Assistants; F. Endorsement by the American Diabetes Association; G. Endorsement by the Centers for Disease Control and Prevention; H. Endorsement by Utah Medical Association; I. Endorsement by American College of Physicians; J. Endorsement by American Academy of Family Physicians; K. Availability of materials; and L. Other (Please Specify).

Table 11.
Percentage of Utah Providers Endorsing Selected Factors Perceived to Enhance Their Routine Use of Diabetes Practice Standards
Diabetes Care in Utah 2001

Selected Factors	Percentage
Professional education	60.30%
More comprehensive reimbursement	49.90%
Changes in health care policy	22.90%
Endorsement by the Utah Nurses Association	7.00%
Endorsement by the Utah Academy of Physician Assistants	8.00%
Endorsement by the American Diabetes Association	19.50%
Endorsement by the Centers for Disease Control and Prevention	10.00%
Endorsement by Utah Medical Association	9.70%
Endorsement by American College of Physicians	11.00%
Endorsement by American Academy of Family Physicians	15.20%
Availability of materials	61.10%
Other	14.90%

There were clear variations in percentage levels by factor. Availability of materials and professional education were each cited by over three of five providers (61.1% and 60.3 %, respectively) as factors that would enhance their routine use of diabetes practice standards (Table 11). About one-half of providers chose more comprehensive reimbursement levels as an enhancement factor (49.9 %), more than double the next most cited factor, changes in health care policy (22.9 %).

Endorsements by various professional and governmental entities were consistently less popular than the items already noted. Moreover, there were variations in the percentage of providers stating that their routine use of diabetes practice standards would be enhanced across the various organizations within this general grouping. Table 11 shows that those endorsements cited most often were those of the American Diabetes Association (19.5 %) and by the American College of Physicians (15.2 %). Less than one of ten providers each reported that endorsements by the Utah Medical Association (9.7 %), Utah Academy of Physician Assistants (8.0 %) and Utah Nurses Association (7.0 %) would enhance their routine use of diabetes practice standards.

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